# The Power to Save

Preserve our environment and make some change

# Challenging Designers–Prototype Elementary Schools Zach and Bacon Make the Grade

*Fort Collins Utilities' Integrated Design Case Study*

## The Challenge

Poudre School District issued a challenge: Take the best performing school in the district—and beat it.

Make it a place that students and teachers want to spend their days. Add more daylighting and use low-toxicity paints and materials. Include air conditioning, but don't increase the utility bills. Use recycled and recyclable products. Make the building itself serve as a learning laboratory. Utilize landscaping that saves water. Make sure it's easy and uncomplicated to maintain. And—build it for no added cost.

> ***"We can't afford not to build schools like these."***
>
> *-Michael Spearnak, AIA, Poudre School District*

"The traditional design approach sets minimum requirements, but doesn't push design teams to come up with the best achievable design," said Spearnak, the District's director of planning, design and construction. "We encouraged designers to create a school that would set a new standard in learning environments, yet fit within a typical school budget."

And, this is how the new prototype school was established at Zach and Bacon Elementary Schools.


*Students in the Explorer LAB class lead tours of Bacon Elementary.*

## Focus on the Classroom

"Kids spend most of their time in the classroom, so we focused the creative energy and analysis on the classroom design first and worked our way out," said Spearnak. "Our goal was to make every classroom terrific with good daylighting and views, minimal glare, windows that can be opened, good ventilation and year-round comfort."

Energy and daylighting modeling helped optimize the classroom design at both schools.

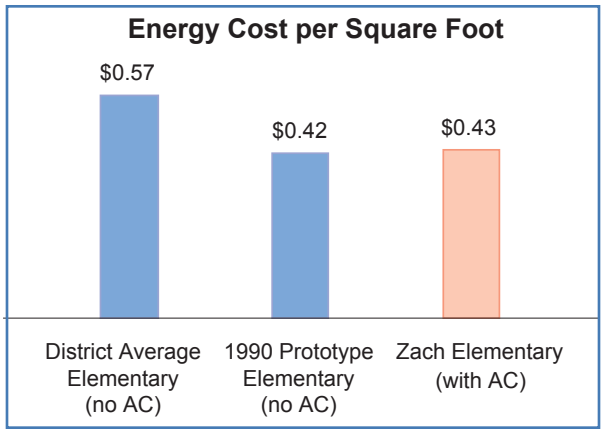
## Costs of High-Performance Building

While initial design fees were higher, construction costs were lower. At Zach Elementary, construction costs came in under budget at $100 per square foot.

The District paid more for design costs (10 percent instead of the usual 7-8 percent) because they spent extra time optimizing the plan. Even with this added expense, the District will benefit from lower utility bills and by using this prototype design to build future schools.

### Integrated Design Assistance

This project received support from Fort Collins Utilities' Integrated Design Assistance Program. The program offers staff support and expertise during the design process and financial assistance to supplement the incremental cost of access to consultants.




# Project Details

**Facility**
Poudre School District
Zach Elementary (opened fall 2002)

**Size**
525 student capacity, grades K-6
63,000 square feet total

**Location**
Fort Collins

**Project Cost**
$6.3 million or $100 per square foot

**Energy Cost (FY03)**
$27,358 in gas and electricity costs; $0.43 per square foot (compare to $0.42 for 1990 prototype or $0.57 average for all elementary schools, all without air conditioning)

**Energy Use (FY03)**
Electricity 306,000 kWh; gas 2,208 therms; total 50 kBtu per square foot per year

**Energy Savings (FY03)**
Compared to district average elementary per square foot costs; $8,800 savings in gas and electricity costs

**Water Use (FY03)**
417,834 gallons or 980 gallons per student

**Water Cost (FY03)**
$1,430 or about one-third of 1990 prototype school

**Contacts**
- Stu Reeve, (970) 490-3502, stur@psdschools.org
- Mike Spearnak, (970) 490-3413, pdc@psdschools.org

## Low Utility Bills— Even with Air Conditioning

"With the focus on student performance, the District chose to include air conditioning in the new school design," said Stu Reeve, energy manager for Poudre School District. "Yet, even with cooling, Zach's annual gas and electricity bills are nearly the same as other recently built elementary schools and much lower than our average elementary."

Efficient use of water is increasingly important in Colorado. Water usage at Zach is way below that of other schools, with water bills at one-third that of the 1990 prototype schools.

"The new design focuses on the students," said Reeve. "Yet, it will save thousands of dollars in lower water and energy bills every year for the life of the schools."

## Buildings that Teach

At Bacon Elementary, students in the Explorer LAB class lead tours that show their school's energy saving and environmental features by:

- pointing to a glass cut-out to show what is in the walls;
- explaining how the chiller saves money by making ice at night;
- showing recycled materials; and
- describing the water-saving landscaping.

Typically, the 'inner workings' of a building are hidden, so Bacon presents many unique learning opportunities for students.

*The slope of the ceiling, window type and placement all impact the visual comfort of a classroom and other interior spaces.*

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Phone: (970) 221-6700 • TDD: (970) 224-6003
Web: fcgov.com/powertosave • E-mail: powertosave@fcgov.com

City of Fort Collins Utilities